Appl. No.:   09/675,530
Amdt. dated April 14, 2004
Reply to Office action of February 20, 2004

REMARKS/ARGUMENTS

Applicants received the final Office Action dated February 20, 2004, in which the Examiner: (1) rejected claims 28-32 as anticipated by US Patent No. 6,292,576 ("Brownlee"); (2) rejected claims 1, 4, 6-8, 13-20, and 25-27 as obvious in view of US Patent No. 5,963,656 ("Bolle") and US Patent No. 5,881,182 ("Fiete"); (3) rejected claim 5 as obvious in view of Bolle, Fiete, and US Patent No. 4,600,675 ("Iwasa"); (4) rejected claims 21 and 24 as obvious in view of Bolle, Fiete, and Brownlee; (5) rejected claims 9-12 and 22-33 as obvious in view of Bolle, Fiete and US Patent No. 5,987,146 ("Ackland"); and (6) rejected claims 33-37 as obvious in view of Brownlee and Ackland.

In this Response, Applicants amend claims 1, 2, 16, 25, 27, 28 and 33. Also, claims 38-40 have been added and no claims have been cancelled. Therefore, claims 1-40 are pending. Based on the amendments and arguments contained herein, Applicants respectfully request reconsideration and allowance of the pending claims.

I.   § 102 REJECTIONS

Amended claim 28, in part, requires a "DSP, wherein the DSP is further configurable to determine a most common grayscale value of pixels for each pixel line of an image and detect when at least one pixel line has a most common grayscale value below a predetermined threshold." Neither Brownlee nor the other art cited by the Examiner teaches or suggests this limitation.

Brownlee teaches a system that detects a false fingerprint. To detect a false fingerprint, the system captures a first and a second image of a fingerprint (see Figure 5, col. 2, lines 34-62). The first image is created with illumination from an orthogonal light source. The second image is created with illumination from an angled light source (see col. 3, line 62 - col. 4, 17). If the two images displays more than a threshold amount of difference a finger is identified as real. Otherwise, the finger is identified as false (see Figure 5, col. 7, line 59 – col. 8, line 27).

Bolle teaches a system that determines the quality of a fingerprint image. To detect the quality of a fingerprint image, the system taught in Bolle divides a

fingerprint image into blocks. For each block, the system analyzes changes in pixel intensity across the block (see Figure 8A, col. 5, line 35 – col. 7, line 32). If there is more than a threshold amount of changes in pixel intensity across a block, the block is considered to be of good quality. Otherwise, the block is considered to be of poor quality (see Figure 8A, col. 5, line 35 – col. 7, line 32). If more than a threshold number of block are determined to be of good quality, the entire fingerprint image is considered to be of good quality. Otherwise, the entire fingerprint image is considered to be of poor quality (see Figure 8A, col. 5, line 35 - col. 7, line 32).

Fiete teaches a system that removes streaks from digital images. As taught in Fiete, streaks are caused by imperfect calibration of image (light) sensors and changes in performance of the image sensors over time (see col. 1, line 30 – col. 2, line 26). To correct for streaks, "two adjacent columns of image data are selected." The mean value of the pixels of each column is determined (see col. 5, line 5 – col. 6, line 51). If the mean pixel value of adjacent columns changes by more than a threshold amount, a correction is made. The same process is carried out for each pair of adjacent columns whereby streaking is reduced across an image (see col. 5, line 5 – col. 6, line 51).

None of the art cited by the Examiner teaches or suggests "[determining] a most common grayscale value of pixels for each pixel line* as required in claim 28. Furthermore, none of the art cited by the Examiner teaches or suggests a DSP that "determines when at least one pixel line has a most common grayscale value below a predetermined threshold." As previously mentioned, Fiete compares mean pixel values of adjacent columns with each other. However, the mean value is not the same as "the most common grayscale value of pixels for each pixel line" as required in claim 28. Also, comparing the difference between mean values of adjacent columns as taught in Fiete is not the same as "[determining] when at least one pixel line has a most common grayscale value below a predetermined threshold." In summary, Fiete compares the difference between adjacent columns to determine streaking, while claim 28 compares the most common grayscale value of each pixel line to a threshold value. For at least

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these reasons, Applicants submit that claim 28 and all claims that depend from claim 28 are allowable.

II.   § 103 REJECTIONS

Amended claim 1, in part, requires "an interface [that] is configured to compare subsequent images and determine if the subsequent images include bands that differ positionally." None of the art cited by the Examiner teaches or suggests this limitation.

As previously described both Bolle and Fiete teach systems that examine single images. While Brownlee does teach comparing multiple images, Brownlee does not teach determining if "subsequent images include bands that differ positionally" as required in claim 1. Rather, Brownlee detects a real finger by comparing two images of a finger when the two images are created with different angles of illumination. None of art cited by the Examiner teaches or suggests "an interface" that "determine[s] if the subsequent images include bands that differ positionally" as required in claim 1. For at least this reason, Applicants submit that claim 1 and all claims that depend from claim 1 are allowable.

Amended claim 16 requires "capturing a sequence of fingerprint images," "comparing the fingerprint images" and "determining if the fingerprint images include bands having different positions." As described above for claim 1, none of the art cited by the Examiner teaches determining if "subsequent images ...include bands having different positions" as required in claim 16. For at least this reason, Applicants submit that claim 16 and all claims that depend from claim 16 are allowable.

Amended claim 25, in part, requires "a processing means for comparing sequential fingerprint images and for determining if the sequential fingerprint images include non-stationary bands attributable to condition changes during the capturing of the fingerprint images." As described above for claim 1, none of the art cited by the Examiner teaches or suggests "determining if the sequential fingerprint images include non-stationary bands" as required in claim   25. Furthermore, none of the art cited by the Examiner teaches or suggests "non-stationary bands attributable to changes during the capturing of the fingerprint

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images" as required in claim 25. For at least this reason, Applicants submit that claim 25 and all claims that depend from claim 25 are allowable.

III.   NEW CLAIMS

Claim 38, in part, requires "a processor coupled to [a] biometric device; wherein the processor is configured to compare subsequent images and determine if the subsequent images have greater than a predetermined amount of pattern changes; and wherein, if the subsequent images have greater than a threshold amount of pattern changes, the processor determines a most common grayscale value of pixels for each pixel line to detect if image banding exists wherein the image banding is attributable to condition changes during a scanning process of each image." None of the prior art cited by the Examiner teaches or suggests all of these limitations.

Brownlee does teach detecting changes in multiple fingerprint images due to using different angles of illumination for each fingerprint image. However, none of the art cited by the Examiner teaches or suggests that "if the subsequent images have greater than a threshold amount of pattern changes, the processor determines a most common grayscale value of pixels for each pixel line" as required in claim 38. Furthermore, none of the art cited by the Examiner teaches or suggests "image banding" that "is attributable to condition changes during a scanning process of each image." Applicants cannot find a "scanning process" as required in claim 38 mentioned in any of the art cited by the Examiner. For at least these reasons, Applicants submit that claim 38 and all claims that depend from claim 38 are allowable.

IV.   CONCLUSION

In the course of the foregoing discussions, Applicants may have at times referred to claim limitations in shorthand fashion, or may have focused on a particular claim element. This discussion should not be interpreted to mean that the other limitations can be ignored or dismissed. The claims must be viewed as a whole, and each limitation of the claims must be considered when determining the patentability of the claims. Moreover, it should be understood that there may

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be other distinctions between the claims and the prior art which have yet to be raised, but which may be raised in the future.

Applicants respectfully request that a timely Notice of Allowance be issued in this case. If any fees or time extensions are inadvertently omitted or if any fees have been overpaid, please appropriately charge or credit those fees to Hewlett-Packard Company Deposit Account Number 08-2025 and enter any time extension(s) necessary to prevent this case from being abandoned.

Respectfully submitted,

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